REMARKS

These remarks are in response to the non-final Office Action mailed September 29, 2003. No claims have been amended. Applicants respectfully request reconsideration and allowance of the pending claims.

I. REJECTION UNDER 35 U.S.C. §103

Claims 98-110, 112-123 and 126-159 stand rejected under 35 U.S.C. §103 as allegedly obvious over Gibson in view of Barisci (Trends in Polymer Science, 1996) and Casella, Thackeray, Yamato, Naarmann, Li, Sakaguchi, Stetter (U.S. 5,512,882) or Wampler and Breheret, Mifsud I, Mifsud II, Moy or Persaud. Applicants respectfully traverse for reasons of records and for reasons newly presented below.

The Examiner appears to maintain that electrochemical sensors, which are structurally and functionally different than Applicants' claimed invention, somehow render Applicants' claims obvious. Applicants respectfully disagree. Applicants again direct the Examiner to Sestak (Sestak is not prior art), which actually teaches away from electrochemical sensors, demonstrating that one of skill in the art, even after Applicants' filing date, would not have looked to teachings that use electrochemical sensors.

Applicants respectfully submit that the Examiner has not set forth a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. MPEP §2143. First, there must be some suggestion or motivation, either in the references themselves or in the

knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); MPEP §2143.

Suggestion or motivation for combination of references. The Examiner suggests that a combination of the references would result in the claimed invention. However, there is no suggestion in any of the references for the proposed combination. Furthermore, references after Applicants' filing date actually teach away from the combination. As the CAFC stated in *ACS Hospital Systems Inc. v. Montefiore Hospital*, 221 USPQ 929, 933 (1984):

> Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so.

Furthermore, in *In re Gordon*, 221 USPQ 1125, 1127 (Fed.Cir. 1984), *citing In re Sernaker,* 217 USPQ 1, 6-7 (Fed. Cir. 1983) and *In re Imperato*, 179 USPQ 730, 732 (CCPA 1973):

> The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification.

A. The Cited References Cannot Be Combined In View Of The Teachings In The Art

The combination of the electrochemical sensors (e.g., Barisci, Casella, Thackeray et al., Yamato et al., Galal, Naarman, and Li) with Gibson is contrary to the evidence of record and the teaching of those of skill in the art as represented, for example, by Sestak.

The deficiencies of the cited references cannot be remedied by general conclusions about what is "basic knowledge" or "common sense" to one of ordinary skill in the art. "Rather, the Board must point to some concrete evidence in the record in support of these findings." *In re Zurko,* No. 96-1258 Federal Circuit, August 2, 2001. Respectfully, the Examiner has ignored the factual teachings of record and maintained a combination that is not supported by those of skill in the art. For example, the current rejection combines polymer-polymer sensors with electrochemical sensors to arrive at, for example, polymer-inorganic sensors that are not electrochemical in nature even when the teachings of record indicate (1) that electrochemical sensors have poor stability and (2) are ineffective for many purposes. The combination of references proposed by the Examiner would require that the teachings of those of skill in the art be disregarded. Applicants submit that the motivation taught by the references of record would be to *not* combine the references but rather would be to avoid such combinations.

The fact that references can be combined or modified is not sufficient to establish *prima facie* obviousness. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests

the desirability of the combination. *In re Mills,* 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990); MPEP §2143.01. *See also, In re Fritch,* 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992). Applicants submit that there is no desirability to combine the references as clearly indicated by Sestak and Barisci (as discussed in more detail below).

Simply put, to provide a *prima facie* case of obviousness the Patent Office must provide motivation to combine the teachings. The evidence before the Examiner clearly shows, even after Applicants' earliest filing date and after the publication of the Barisci reference, that one of skill in the art would not combine references or otherwise refer to references that teach electrochemical systems, because as Sestak so appropriately stated, electrochemical systems "have the disadvantage of poor stability due to polymer degradation, usually caused by over-oxidation occurring during electrochemical cycling." (See Sestak at page 118, 2nd full paragraph under the "Introduction"). In other words, the Examiner is combining references that a person skilled in the art would not combine, as evidenced by the teachings of Sestak and further by Barisci (as discussed more fully below). For example, the system taught by Casella is electrochemical in nature and thus is subject to the flaws of poor stability and polymer degradation, thus one of skill in the art would not look to the materials of Casella because of the inherent problems in the polymeric material in such systems. As discussed below, Barisci does not overcome these flaws or suggest any advantages to justify the combination.

To try and provide motivation prior to Applicants' conception date the Examiner cites to Barisci. However, Barisci does not provide any motivation to combine the references. Barisci teaches electrochemical systems, and actually teaches away from potentiometric techniques. Barisci is cumulative to the references of record and does not overcome the deficiencies generated upon removal of Sestak as a reference.

Each of the reference is now discussed alone in order to properly describe the teachings of the references. The alleged combinations are then discussed.

B. Applicants' Invention Is A Fundamentally Different Sensor Systems Compared To Casella, Thackeray et al., Yamato et al., Galal, Naarman, and Li

With respect to Casella, Thackeray et al., Yamato et al., Galal, Naarman, and Li, Applicants maintain that Casella, Thackeray et al., Yamato et al., Naarmann, and Li are fundamentally different sensor systems and one of skill in the art would not look to these sensor systems in developing a chemoresistive-type sensors as disclosed and claimed by Applicants. Even if there was some motivation to combine, which there is not, the references cited do not teach or suggest each and every element of Applicants' claimed invention. For example, the electrochemical systems of the cited references utilize a single conductive lead attached to the sensing material, not two leads as recited in Applicants' claims. The claims set forth that the conductive leads are in contact with the sensing area.

Furthermore, the electrochemical systems are based upon redox reactions, which are fundamentally different than resistance measurements as recited in Applicants' claims. The electrochemical sensors do not measure changes "across" the sensor material as recited in Applicants' claimed invention.

- Casella teaches a sensor layered with polyaniline. The Casella sensor measurements are performed using an electrochemical system (see Exhibit A of prior response filed February 24, 2003). For example, Casella teaches at page 218, §2.2 "Apparatus", that "[c]yclic voltammetry (CV) was done in a *three-electrode cell* using a Cu-PANI working electrode, a saturated colomel reference electrode (SCE) . . . and a platinum foil counter electrode." As such the Casella sensor has only a single conductive lead and measures redox reactions upon the sensor material. Casella does not teach or suggest the elements of Applicants' claimed invention (e.g., two conductive leads, and changes of resistance).
- Thackeray et al. is electrochemical in nature, requiring an electrolyte media containing ions to maintain a potential on the sensor. The electrochemical reaction involves a transfer of faradic charge and associated ions between the sensor of Thackeray et al. and the phase containing the analyte to be sensed. Thus, a vapor cannot be in direct contact with the sensor described in Thackeray et al. for such a sensor to function as intended. The sensors of Thackeray et al. measure a change in redox at the sensor interface with the electrolyte medium.

- Yamato et al. teaches a sensor for electrochemical measurements. The sensor material of Yamato et al. is utilized in a "*three-electrode cell* containing 5 ml of 0.1 M KCl/0.1 M phosphate buffer (PB, pH 7.5) solution." (see page 232, §2.4 "Measurements"). As such the Yamato et al. sensor has only a single conductive lead and measures a change in redox at the sensor interface with the electrolyte medium. Yamato et al. do not teach or suggest two conductive leads attached to a sensor as recited in Applicants' claims. Yamato et al. do not teach or suggest resistivity measurements as recited in Applicants' claims.
- Naarmann also teaches electrochemical systems. For example, Naarmann teaches that the electrochemical polymer material can be used as an electrode or electrodes in electrochemical storage cells (see English Abstract).
- Li (Materials Research Society Symposium Proceedings, 1995) also teaches electrochemical sensors (i.e., sensor that comprise a single conductive lead). For example, at page 583-584, Li shows the use of a PANI-Pd film as an electrode (e.g. a cathode/anode) in an electrochemical cell. Li does not teach or suggest a sensor comprising two conductive leads that undergo a measurable change due to adsorption or absorption of an analyte.

1. The Cited References Do Not Teach Or Suggest Each and Every Element of Applicant's Claimed Invention

Accordingly, each of the foregoing reference clearly fails to teach each and every element of Applicants' claimed

invention. This is applicable to the individual references, as well as the combination of each of the foregoing references. All the foregoing references fail for at least the foregoing same reasons.

Applicants respectfully submit that the Barisci reference relied upon by the Examiner is cumulative to Gibson and cumulative to the references that teach electrochemical sensors. Barisci allegedly describes composites of two polymeric materials (see, e.g., page 311, first paragraph). The alleged composites include polypyrrole and another polymeric material (polyamide or Nafion - a perfluorinated polymer). These alleged composites do not teach or suggest Applicants' claimed invention as described, for example in claim 98.

As with Gibson, Barisci does not teach or suggest sensing areas comprising non-organic polymers. The Examiner is directed to the prior Final Office Action at page 3, lines 13-16, wherein the Examiner stated, "Gibson does not teach . . . two materials. . . mixed together to form a single sensing material having the compositionally different conductive material within the conductive organic material or as a sensing array having sensors that are not organic polymer based." Barisci teaches at most a composite of two organic polymer based materials. This is both functionally and structurally different than Applicants' claimed invention. Claim 98 reads in part:

> . . . a sensing area comprising alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in contact with, the at least two conductive leads, . . . wherein the compositionally different conductive material is selected from the group consisting of an inorganic conductor, a

carbon black, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases. .

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Applicants respectfully submit that Barisci is cumulative to Gibson and fails to set forth a *prima facie* case of obviousness for the same reasons as discussed for Gibson and the prior references of record.

Additionally, the Examiner indicates that Barisci teaches and suggests potentiometric, current-measuring and conductometric/resistometric methods. Applicants respectfully submit that the potentiometric techniques and the current-measuring techniques taught by Barisci are taught with reference to FIG. 2(a) and FIG. 2(b) of Barisci. Applicants point out that FIG. 2(a) and (b) do not teach or suggest a sensing area between two conductive leads as recited in Applicants' claims, but rather show (as cumulative to the references of record) electrochemical techniques requiring multiple electrodes including a reference electrode and a polymer electrode (please see Barisci Figs. 2a and 2b).

Furthermore, the Barisci reference teaches away from the use of potentiometric techniques because, "[m]ost potentiometric methods are not particularly sensitive and, because measurement should be made at equilibrium, the technique is slow. The long time constants encountered limit the use of this technique to flow-through sensing cells." (See Barisci at, e.g., page 307, second column). The reason that the potentiometric techniques described in Barisci are slow is because they are based upon electrochemical techniques. The structure and function of the

sensors shown in Barisci are fundamentally different than Applicants' claimed invention.

Furthermore, because Barisci does not provide any motivation to combine electrochemical systems to arrive at the Applicants' claimed invention, one of skill in the art would not look to the teachings of Casella, Thackeray et al., Yamato et al., Naarman, and Li as the sensor systems of these references utilize redox reactions (fundamentally different than resistance measurements) and require a different over all system of detecting an analyte compared to Applicants' claimed invention. Applicants submit that there is no motivation to combine these references to arrive at Applicants' invention. Furthermore, even if there was some motivation to combine the references, which there is not, the combination of Barisci, Gibson and any one or more of the electrochemical references does not teach or suggest each and every element of Applicants' claimed invention.

C. Gibson Does Not Teach or Suggest Applicants' Invention Alone or In Combination

The Examiner agrees that Gibson, as the primary reference, does not anticipate the claims. However, the Examiner alleges that the "monomers" disclosed in Gibson are considered compositionally different materials for the purposes of Applicants' claimed invention. Applicants respectfully traverse this rejection.

1. Gibson Does Not Teach Two Different Conductive Materials

The Office Action alleges that Gibson teaches a material having two different monomers used to form a copolymer, which the examiner is treating as within the scope of two different conducting materials. Applicants respectfully disagree that the polymers of Gibson are within the scope of two compositionally different conductive materials.

Two monomers when reacted together do not form two "compositionally different" materials. The two monomers are reacted together to become a polymer that is a single material the cannot be separated into two monomeric materials. Furthermore, a polymer has physical-chemical properties specific for the polymer not the monomers. This is a fundamental principle of chemistry. When two monomers are reacted to become a polymer, the conductive properties of the polymer are not the conductivity of each monomer but are the physical-chemical (i.e., conductive) properties of *the polymer, not the monomers.* Sodium chloride (NaCl) has physical properties that are different than each of the independent elements (Na^+ and Cl^-). In contrast, Applicants' claims recite that the conductive materials are compositionally different. For example, gold has conductive properties that are independent of the conductive properties of a conducting polymer (e.g., polythiophene).

2. Gibson and Barisci Do Not Teach Or Suggest Materials Comprising Non-Organic Polymers

The Office Action states at page 3, lines 13-16, "Gibson does not teach . . .two materials . . .mixed together to form as

a single sensing material having the compositionally different conductive material within the conductive organic material or as a sensing array having sensors that are not organic polymer based." This quotation from the Office Action, and by the Examiners admission, clearly indicates that Gibson does not teach or suggest Applicants' claimed invention. Furthermore, as discussed above, Barisci also only teaches two conductive polymeric materials and is cumulative to the teachings of Gibson.

a. Gibson and Barisci do not teach or suggest a single sensing material having a compositionally different material within the conductive organic material

Applicants' independent claims (e.g., see claim 98) recite:

> . . .a sensing area comprising alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in contact with, the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic material and the regions of the compositionally different conductive material. . .

The Examiner agrees at page 3 of the Final Office Action that Gibson does not teach or suggest such a sensing area as set forth in the foregoing element of Applicants' claims. Similarly, Barisci does not set forth such an element of Applicants' claimed invention.

b. Gibson and Barisci teach and suggest sensors that are only organic polymer based

Furthermore, Applicants submit that neither Gibson or Barisci teach or suggest a compositionally different conductive material:

> . . .selected from the group consisting of an inorganic conductor, a carbon black, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, a superconductor, or a combination thereof. . .

The Examiner agrees at page 3 of the Final Office Action that Gibson does not teach or suggest such "[non]-organic polymer based" sensors.

In addition, Applicants submit that Gibson and Barisci fail to teach or suggest a compositionally different material wherein:

> the inorganic conductor has an electrical conductivity that decreases as the temperature increases. .

(see, e.g., claim 98).

Thus, Gibson and Barisci alone or in combination do not teach or suggest Applicants' claimed invention as the references do not teach or suggest each and every element of Applicants' claimed invention. Accordingly, the Office Action attempt to combine additional references with Gibson and/or Barisci in order to overcome these deficiencies.

3. Gibson/Barisci and Casella Do Not Teach or Suggest Applicants' Claimed Invention

Gibson and Barisci fail to teach or suggest Applicants' claimed invention for the reasons set forth above. The Casella reference teaches an electrochemical sensor as described above and thus one of skill in the art would not look to Casella to overcome the deficiencies of Gibson. The Casella reference does not teach or suggest two conductive leads or that a vapor is in direct conduct with a sensor. The electrode of Casella containing the copper/polyaniline absorbs or releases electrons thereby changing electron flow between the cathode and anode. The combination of Gibson/Barisci, which does not teach a single sensing area between two conductive leads, is combined with Casella, which also does not teach a single sensing area comprising two compositionally different materials between two conductive leads. Thus, the combination fails to teach or suggest the following:

> . . .alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in contact with, the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic material and the regions of the compositionally different conductive material, and wherein the sensing area is in direct contact with a vapor comprising an analyte to be detected

(See, e.g., claim 98).

4. Gibson/Barisci and de Lacy Costello Do Not Teach or Suggest Applicants' Claimed Invention

De Lacy Costello is combined with Gibson and/or Barisci to overcome the deficiencies of set forth above. However, the combination of Gibson/Barisci and de Lacy Costello fails to teach or suggest the temperature/conductivity characteristics of Applicants claimed invention. For example, Gibson/Barisci and de Lacy Costello fail to teach or suggest:

> . . .wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases. .

(See, e.g., claim 98).

5. Gibson/Barisci and Thackeray et al. Do Not Teach or Suggest Applicants' Claimed Invention

Thackeray et al. teach an electrochemical sensor as described above and thus one of skill in the art would not look to Thackeray et al. to overcome the deficiencies of Gibson and/or Barisci. The chemistry that produces a signal in Thackeray et al. is electrochemical in nature, requiring an electrolyte media containing ions to maintain a potential on the sensor. The electrochemical reaction involves a transfer of faradic charge and associated ions between the sensor of Thackeray and the phase containing the analyte to be sensed. Thus, a vapor is not in direct contact with the sensor of Thackeray et al. In the prior Office Action mailed October 23, 2002, the Examiner addresses Applicants' arguments by stating that, "The Thackeray reference is clearly sensitive to gases - hydrogen and oxygen." (See, e.g., page 12 of the October 23, Office Action). Applicants respectfully submit that Thackeray

et al. is sensitive to hydrogen and oxygen atoms because REDOX reactions are the basis of how the sensor system of Thackeray et al. works. Applicants respectfully submit that the sensors of Thackeray et al. would cease to function if they were directly contacted with a vapor containing an analyte because the Thackeray et al. sensors would be unable to perform REDOX reactions.

Thackeray et al. do not teach or suggest that an analyte is capable of adsorbing or absorbing to the sensor material. The sensor material of Thackeray et al. is sensitive to changes in electrons in the electrolyte medium (i.e., oxidation or reduction due to the presence of hydrogen or oxygen). The combination of Gibson and/or Barisci, which do not teach a single sensing area between two conductive leads, is combined with Thackeray et al., which also does not teach a single sensing area comprising two compositionally different conductive materials between two conductive leads. Thus, the combination of references fail to teach or suggest the following element of Applicants' claims:

> . . .alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in electrical communication with, the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic material and the regions of the compositionally different conductive material. . .

6. Gibson/Barisci and Yamato Do Not Teach or Suggest Applicants' Claimed Invention

Gibson and/or Barisci is further combined with Yamato et al. Yamato et al. teach sensors having on their surface glucose oxidase (GOD), an enzyme (see, Yamato at page 235, first column, section 3.2). Applicants submit that an enzyme linked electrochemical (oxidation reduction) system is far removed from Applicants' claimed invention and thus one of skill in the art would not look to Yamato to overcome the deficiencies of Gibson.

Applicants submit that even if there were motivation to combine Gibson and Yamato, which there is not, at most the combination would teach the use of immobilized enzymes (very different than conductive materials) on a polymer material for use in an electrochemical system (e.g., having only a single conductive lead). As such Yamato in combination with Gibson and/or Barisci would fail to teach or suggest:

> . . .alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in electrical communication with, the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic material and the regions of the compositionally different conductive material. . .

7. Gibson/Barisci and Naarmann Do Not Teach or Suggest Applicants' Claimed Invention

Gibson/Barisci fail to teach or suggest Applicants' claimed invention for the reasons set forth above. Naarmann is combined with Gibson and/or Barisci to overcome the deficiencies set forth above. Naarmann teaches that the electrochemical polymer

material can be used as an electrode or as sensor electrodes in electrochemical storage cells (see English Abstract). The combination of Gibson and/or Barisci, which do not teach a single sensing area between two conductive leads, is combined with Naarmann, which also does not teach a single sensing area comprising two compositionally different conductive materials between two conductive leads. Thus, the combination fails to teach or suggest:

> . . .alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in contact with, the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic material and the regions of the compositionally different conductive material. . .

(See, e.g., claim 98).

In addition, the combination with Naarmann also fails to teach or suggest:

> . . .selected from the group consisting of an inorganic conductor, a carbon black, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, a superconductor, or a combination thereof. . .

(See, e.g., claim 98).

8. Gibson/Barisci and Li Do Not Teach or Suggest Applicants' Claimed Invention

Gibson/Barisci fail to teach or suggest Applicants' claimed invention for the reasons set forth above. Li also teaches electrochemical sensors (i.e., sensors that have a single

conductive lead). For example, at page 583-584, Li shows the use of a PANI-Pd film as an electrode (e.g. a cathode/anode) in an electrochemical cell. Li does not teach or suggest a sensor comprising two conductive leads that undergo a measurable change due to adsorption or absorption of an analyte. The combination of Gibson and/or Barsici, which does not teach a single sensing area between two conductive leads, is combined with Li, which also does not teach a single sensing area comprising two compositionally different conductive materials between two conductive leads. Thus, the combination fails to teach or suggest:

> . . .alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in contact with, the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic material and the regions of the compositionally different conductive material. . .

(see, e.g., claim 98).

9. Gibson/Barisci And Sakaguchi Do Not Teach Or Suggest Applicants' Claimed Invention

Gibson/Barisci fail to teach or suggest Applicants' claimed invention for the reasons set forth above. Sakaguchi teaches electrode (e.g. a cathode/anode) reactions (see, e.g., page 7, line 11-12 of the Final Office Action). Such electrode reactions are used in electrochemical cells. Sakaguchi does not teach or suggest a sensor comprising two conductive leads that undergo a measurable change due to adsorption or absorption of an analyte. The combination of Gibson and/or Barisci, which do

not teach a single sensing area between two conductive leads, is combined with Sakaguchi, which also does not teach a single sensing area comprising two compositionally different conductive materials between two conductive leads. Thus, the combination fails to teach or suggest:

> . . .alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in contact with, the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic material and the regions of the compositionally different conductive material. . .

(See, e.g., claim 98).

10. Gibson/Barisci and Wampler Do Not Teach or Suggest Applicants' Claimed Invention

Gibson/Barisci fail to teach or suggest Applicants' claimed invention for the reasons set forth above. Gibson and/or Barisci is further combined with Wampler in an attempt to overcome the deficiencies set forth above with respect to Gibson and Barisci. Wampler teaches that polypyrrole composites are useful for eliminating Cr(VI) in the environment by reducing Cr(VI) to Cr(III) (see, e.g., page 1820). Wampler, however, does not teach or suggest composites as chemoresistive-type sensors comprising a sensing area separating two electrical leads that measure a change in the electrical properties of the composite (i.e., the sensing area) between the two leads when contacted with an analyte. Thus, the combination does not teach or suggest a single sensing area comprising two compositionally different conductive materials between two conductive leads.

The combination of Gibson and/or Barisci and Wampler fails to teach or suggest:

> . . .alternating regions of a conductive organic material and a conductive material compositionally different than the conductive organic material disposed between, and in contact with, the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic material and the regions of the compositionally different conductive material. . .

(See, e.g., claim 98).

11. Gibson/Barisci and Breheret Do Not Teach or Suggest Applicants' Claimed Invention

Gibson and/or Barisci is also combined with Breheret. Breheret mentions two different types of sensors: 1) semiconductor gas sensors, and 2) conducting polymer sensors. Neither of the two types of sensors is described nor does Breheret teach or suggest the composition of the sensors. The only description found in the Breheret reference is to the "AROMASCAN A20S Device". Applicants respectfully submit that the Breheret reference is not enabled for any teaching relied upon by the Examiner to render Applicants' invention obvious. For example, there is no teaching or suggestion in Breheret that overcomes the deficiencies of Gibson.

However, even if the Breheret reference was enabled, which it is not, Breheret teaches away from Applicants' claimed invention due to the teaching that polymer films are less sensitive than semiconductive gas sensors. This is in contrast to the unexpected finding presented in Applicants' disclosures

which teaches that the conductive organic polymers and compositionally different conductive material composites have orders of magnitude better sensitivity than other conventional polymer composites to amine analytes. Accordingly, the combination of Gibson and/or Barisci, and Breheret fail to teach or suggest each and every element of Applicants' claimed invention.

12. Gibson/Barisci and Mifsud Do Not Teach or Suggest Applicants' Claimed Invention

Gibson and/or Barisci is also combined with Mifsud. Mifsud does not teach or suggest the composition of the sensors. Applicants respectfully submit that the Mifsud reference is not enabled for any teaching relied upon by the Examiner to render Applicants' invention obvious. For example, there is no teaching or suggestion in Mifsud that overcomes the deficiencies of Gibson and/or Barisci. The only teaching that would allow a person skilled in the art to have the faintest idea as to the composition of the conductive polymer sensors is found at column 1, lines 53-64, which teaches that the conductive polymer sensors "have a film made of a conductive polymer sensitive to the molecules of odorous substances." Mifsud fails to teach or suggest a sensing area of a conductive organic polymer and a compositionally different conductive material.

13. Gibson/ Barisci and Moy Do Not Teach or Suggest Applicants' Claimed Invention

Gibson and/or Barisci is also combined with Moy. Moy does not teach or suggest the composition of the sensors. Applicants respectfully submit that the Moy reference is not enabled for any teaching relied upon by the Examiner to render Applicants' invention obvious. Moy allegedly teaches an array made up of one or more metal oxide sensors and one or more polymer sensors. However, there is no other description as to the composition, function, or other characteristics of Moy's sensors. Applicants respectfully submit that Moy fails for the same reasoning as presented for Breheret and Mifsud above. The Moy reference does not teach or suggest any polymer materials used in the "polymer sensors". Moy does not teach or suggest a sensor comprising a composite having both a conductive organic material and a compositionally different conductive material. Nor does Moy teach or suggest an array of sensors, wherein at least one sensor comprises a material having both a conductive organic material and a compositionally different conductive material. Thus, the combination of Gibson and/or Barisci, and Moy do not teach or suggest Applicants' claimed invention.

14. Gibson/Barisci and Persaud Do Not Teach or Suggest Applicants' Claimed Invention

Gibson and Barisci are addressed above and are deficient in that, for example, Gibson fails to teach or suggest a composite of a conducting organic material and a conducting material that

is compositionally different (as admitted by the Examiner). Applicants respectfully submit that Persaud fails for the same reasoning as presented for Breheret, Mifsud, and Moy, above. Persaud teaches as most a sensor having an organic polymeric semiconductor such as polyindole (see, e.g., page 4, line 2). Persaud does not teach or suggest a sensor having a sensing area comprised of a combination of a conductive organic material and a compositionally different conductive material. Nor does Persaud teach or suggest an array of sensors, wherein at least one sensor comprises a material having both a conductive organic material and a compositionally different conductive material. Thus, the combination of Gibson and/or Barisci, and Persaud do not teach or suggest Applicants' claimed invention.

The Examiner states in the Office Action at page 10, last line, that "The Stetter reference shows the interchangeability of carbon black and metal particles as components in a polymer sensor." Applicants submit that this statement is consistent and cumulative with the Harsanyi reference filed September 5, 2003, in which Applicants submitted that carbon black is interchangeable with metals such as gold, silver and the like. Thus, the addition of Stetter in the multiple combinations does not add anything new to the rejection but is rather cumulative to the references of record.

To briefly summarize this response, Gibson admittedly does not teach or suggest each and every element of Applicants' claimed invention. For example, Gibson does not teach or suggest a single sensing area comprising two compositionally different conductive materials between two conductive leads as

recited in Applicants' independent claims. Barisci is cumulative to the teachings of Gibson. The remaining references fail to overcome this deficiency. Sestak et al., Torsi et al. and Galal are unavailable as prior art to Applicants' claimed invention. In addition, Casella, Thackeray, Yamato, Galal, Naarmann, and Li teach and suggest fundamentally different sensor systems and one of skill in the art would not look to these sensor systems in developing a chemoresistive-type sensors as disclosed and claimed by Applicants.

Applicants respectfully submit that the Examiner has not set forth a *prima facie* case of obviousness for at least those reasons set forth above and for reasons already of record.

Accordingly, Applicants respectfully request withdrawal of the §103 rejection.

Enclosed is a $110 check for check for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 1/23/04

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